

CALIFORNIA ENERGY OUTLOOK REPORT
VOLUME 1
STAFF DRAFT OUTLINE
- *Work in Progress* -

Audience: The outline has been developed assuming the audience is fourfold: 1) Governor and Legislature, 2) local and regional market participants, 3) Commission program support, and 4) other governmental agencies, both within and outside California.

Theme: The report will focus on energy market developments, supply risks, demand responsiveness and reliability implications. The purpose of the report is to identify the integrated electricity and natural gas system's reliability issues, market deregulation and competition developments, and to present policy options, including actions on the demand side of the market, for developing a balanced and reliable energy system.

I. Overview of the California Energy Market Developments

This introductory chapter will summarize developments in the last few years, the general state of California's energy systems, and status of Commission programs.

II. Electricity Market Issues and Policies

California has made great strides in deregulating the electricity industry and creating a competitive market that provides opportunities for consumer choice. However, the market is still in transition and has numerous structural issues that need to be resolved. Furthermore, an electricity supply adequacy problem is developing in California and throughout the West. Serious questions have been raised about the incentives of a competitively driven generation system to develop new supplies that would be adequate for extreme summer electricity demand.

A. Changing Responsibilities for System Reliability:

This section will set the stage for the other electricity sections that examine the impacts of different supply scenarios and demand responsiveness sensitivities.

1. Historical reliability responsibilities and regulatory solutions
2. Market developments and scope of upcoming reliability concerns
3. National activities related to bulk power grid reliability
4. Initial findings of the High Temperature/Supply Adequacy Report

- a. High temperatures and electricity demand – peak demand characteristics
 - b. Associated supply adequacy risks
 - c. Implied need for new generation, transmission and/or load management
- 5. Additional measure of reliability risks (focus of following sections)
 - 6. Consideration of costs and benefits for evaluating reliability solutions
 - 7. Balanced market and system structural options for improving reliability

B. Western regional electricity markets and effect on California:

California has historically purchased significant amounts of electricity from out-of-state generators, which are considered an important resource by the ISO to balance California summer reliability needs. However, surplus generation supplies are disappearing and new investments are needed to meet growing demands in most Western states. This section provides California decision-makers with a sense of the energy market developments in other Western states that may affect California trade opportunities and supply risks.

1. Pacific Northwest and Desert Southwest loads and resource balances.
2. Planned new resource development
3. Federal and Western State electricity industry restructuring developments.

C. Publicly-Owned Utility Electricity Issues:

This section will provide a status report on the recent developments for each California municipal utility. Staff will examine the market plans for joining ISO and allowing retail competition by statutory date of December 2000. The municipal utilities have been engaged in efforts to become more competitive with other retail providers.

1. Outlook of public utility loads and resources
2. Consideration for joining the ISO
3. Direct access developments
4. Status of Public Benefits programs

D. Supply adequacy scenarios:

This section would be based on resource adequacy studies of several generation development and retirement scenarios. Simulation models will be used to identify the relative impacts on generation and transmission. The goal is to give interested parties a sense of the potential magnitude of such impacts and a better understanding of the key variables that may affect the future system. For example, California hydroelectric generation levels may vary by as much as 30,000 GWh per year and significantly increase the need for gas-fired generation or electricity imports.

1. Dry hydroelectric generation scenario
2. Comparison of different generation development scenarios
3. Retirement of the California nuclear facilities scenario

E. Prospects for New Generation:

This section will address the fundamental question about the incentives for new generation entry to California. Although electricity prices are high

during certain periods in the summer, prices are relatively low throughout the rest of the year. Recent staff analysis suggests that revenues that could be earned by power plants in the California market are insufficient to make new generation investments profitable.

1. Overview of electricity and ancillary service market prices
 - a. Seasonal and daily price volatility
 - b. Ancillary service and RMR payments
 - c. Congestion costs
2. Costs for building new generation
3. Revenues needed by new generators to remain competitive
4. Boom-Bust Price cycles (scarcity-surplus)

F. Energy Efficiency Resource Opportunities in California:

This section will highlight the value of a continued pursuit towards developing energy efficiency through a variety of program mechanisms. Historic contributions of efficiency investment will be emphasized and the remaining cost-effective potential evaluated. The role of efficiency standards development, the Public Goods Charge and private sector programs will be reviewed. Contributions of energy efficiency opportunities towards solving the supply adequacy problem will be discussed.

G. Distributed Generation Opportunities:

This section will look at the potential benefits and problems that distributed generation may present to the system and end-use customer. This section will also explore the technical and regulatory issues surrounding deployment of distributed generation. The focus will be on the regulatory actions necessary for removing the barriers in creating a market environment for new investments, which is technology neutral. Commercially available and new technologies that are under development will be summarized, with cost and emission data if possible.

H. The Need for Increased Demand Responsiveness in Markets:

This section will focus on trends in direct access market share, and customer responses to increased price volatility. This section will also review existing, new and preferred tariff structures that would facilitate consumer choice. To the extent that data is available, staff will develop quantitative analyses and indicators of changes in demand responsiveness. Customers should be more responsive to prices after the rate freeze because consumption patterns will no longer be exclusively influenced by traditional rate schedules and greater price variability is also expected. A change in the typical summer load profile will serve to alleviate California system reliability risks.

1. Direct Access trends and consumer choice
2. CPUC tariff structures/rate design/the need for changes
3. Interval metering developments
4. Load curtailment programs: Current programs, PX proposals, customer participation
5. Price responsive load bidding into forward markets
6. Opportunities for load shifting

III. Electricity Facility Siting in California

The Energy Commission is witnessing a significant increase in applications to construct new, merchant energy facilities in California. Based on information from recent power plant projects, this chapter highlights key issues and trends, which may influence facility design and location and which could prevent or delay project construction. This chapter also identifies changes being recommended by the Commission to its siting process to improve process efficiency, consolidate permitting authority, and ensure equal regulatory treatment of competing energy facilities.

A. Post-restructuring Realities and their Implications for New Electricity Facility Development in California:

This section will introduce the chapter by identifying key aspects of the current competitive and regulatory environments, which are influencing the potential for new merchant energy facility development in California.

B. Current Plans to Build New Generation and Transmission Facilities in California and their Characteristics:

This section will present the current inventory of recently approved and recently proposed energy facilities in California and describe their common characteristics.

1. Maps and tables showing planned projects
2. Power plant characteristics

C. Issues and Trends Influencing New Energy Facilities and Regulatory Decisions:

This section will examine market and regulatory factors that affect the design, location and future operation of new electric facilities in California. The issues and trends highlighted in this section will be supported by information from recent energy-facility siting cases.

1. Market Trends
2. Environmental Issues and Trends
3. Land Use Issues and Trends
4. Transmission Issues and Trends
5. Permitting Issues and Trends
6. Compliance Issues

D. Conclusions and Recommendations:

This section will present conclusions about the potential for new electricity generation in California and the need for recommended actions by government, industry and the public to ensure timely approval of acceptable facilities.

IV. Natural Gas Market Issues and Policies

Natural gas market restructuring is a continuing process that is now in its third decade. While significant changes have already been made to the structure of the gas market, additional steps are being taken in light of the growing convergence of the electricity and natural gas markets. For example, throughout California, industry experts expect growth in natural gas consumption will be driven by increased demand for electric generation. As such, electricity restructuring is of great relevance for the gas industry. In particular, the focus of gas regulatory activities has become more short-term than it was in the recent past.

Part IV will first consider the regulatory and market-related activities that have implications for energy market competition and system reliability in California. This section will conclude with a discussion of a long-term natural gas price and supply outlook.

A. Natural Gas Industry Regulatory Activity:

The intent of this section will be to provide an appropriate linkage between the key regulatory issues and the market's reaction to the evolving regulation. The section will describe the key natural gas regulatory developments emerging both in California and at the federal level. Some of these areas include, but may not be limited to: access to interstate pipeline capacity, utility service unbundling, rate design, cost allocation, and retail services.

At the federal level, FERC policy statements (RM98-10, RM98-12), adopted in early February 2000, will be assessed. The statements primarily address short-term capacity issues. Within California, the section will be expanded to consider settlement negotiations between stakeholders, part of the CPUC's continuing investigation into promising options for further in-state industry restructuring (I.99-07-003). Also to be considered will be the potential impacts that key CPUC cost allocation and rate design decisions will have on the California gas market. Finally, the role of the state legislature in the restructuring process and an overview of key gas market-related legislation (AB1421 —Chaptered 10/10/99, AB1002 — Currently under review) will also be discussed.

B. Market Issues:

Building on the discussion in the previous section, this section assesses the major market-oriented issues expected to impact the California natural gas market during the next few years. For all of California, specific attention will be paid to the need by industry players to hold firm pipeline capacity on interstate pipelines to California and the potential to do the same for in-state pipeline capacity. Particular attention will be given to the current firm capacity contract between El Paso Natural Gas and Enron North America. In Southern California, specific focus will be on: 1) the impact of the SoCalGas-SDG&E merger, and 2) the desire of parties to expand/extend interstate pipelines into the SoCalGas service territory.

C. Long-term outlook for the natural gas market:

This section will summarize the results of the base case natural gas supply and price forecast. Readers interested in greater detail will be referred to the Commission's forthcoming Natural Gas Outlook document. (Implications on gas demand and price due to various electricity system scenarios are discussed in Section V-B.)

V. Electricity/Natural Gas Market Interactions

Most, if not all, of the proposed power plants to be built in California (and throughout the West) will be fueled only by natural gas. Although these facilities have very good heat rates and may replace some of the existing, less efficient generation capacity, natural gas demand will expand. Potentially, natural gas demand for power generation could more than double current requirements during the next 20 years. This section will focus on the impacts that increased natural gas-fired generation could have on gas demand, the need for new pipeline capacity, and implications for electricity reliability in the context of natural gas reliability.

A. Short introductory section:

A discussion of the principal factors driving the increase in gas demand for electricity generation.

B. Implications of new power plants on gas demand and the need for new pipeline capacity:

Previous Commission work has shown that over the next decade there will be a need to add new interstate pipeline capacity to serve California. Most of that need is the result of increased demand for power generation fuel. That work was based on the continued use of the existing generation facilities. With all of the proposed generation capacity, the analysis needs to be revisited. Growth in natural gas demand could very well shift both in time and location, due to new power plant construction. Possible changes in gas demand requirements will be investigated for three scenarios: a market-driven scenario of gas-fired power plant construction; the closure of Diablo Canyon nuclear plant; and a scenario of low hydroelectricity availability. Based on the findings regarding potential gas demand for power generation, staff will investigate future natural gas pipeline adequacy. This work would be directed to assisting the natural gas industry in making individual decisions on how to serve the California market.

C. Dual Fuel Update:

This section will provide an overview of the implications for electricity reliability due to the combined effects of: 1) peaks in natural gas demand

during winter cold spells, 2) anticipated increased reliance on gas-fired power generation, and 3) a degradation in the capability of power plants to switch to oil as a fuel during infrequent peak-period curtailments in natural gas deliveries. It will expand on the initial findings of a recent ISO study regarding the need for power plants to maintain oil-burning capability, along with recommendations on the study provided by the Commission (August 1999). The core issue is whether the power generation industry has become too complacent regarding the dependability of the winter gas supply.

VI. Energy Related Environmental Concerns

California's electricity and natural gas systems affect and are influenced by a number of critical statewide environmental issues. The Energy Commission is responsible for addressing such issues from both a system overview and for site-specific thermal electricity generation development. While Chapter III of this report addresses the latter areas of concern, this chapter highlights environmental issues that have system or multi-regional ramifications.

A. Hydroelectric Facilities Divestiture:

This section would provide an overview of the issues faced in the ongoing review of the proposed divestiture of the IOU's hydro generation. Data and information would be taken from the work the CEC has accomplished with the Resources Agency. In addition, it will address the present and potential fisheries and water resource issues influencing the generation of electricity from hydroelectric facilities supplying electricity to California.

B. Integrating Energy And Air Quality Issues:

This section will review the immediate work we are undertaking with the California Air Resources Board (CARB). It will review the data we are providing CARB and how that data will be used by CARB, with our assistance, to address future electrical generation emissions and their potential implications. It will also address the greater offset issue, expanding from Chapter III to include the economic and other points set forth in the Electrical Generation Emission Report. This section will set forth the issues for further assessment. To the extent possible, staff will meet with air pollution control districts to brainstorm key issues resulting from new electricity generation development.

C. Potential Global Climate Change Influences

Using the Energy Commission's ER 96 report, its greenhouse gas inventory data and its 1998 Climate Change reports, this section will illustrate the potential areas of influence climate change could have on California's electricity system and its use of fossil fuels. It will include implications of changing rainfall/snowpack on hydroelectricity availability, possibility for increasing air conditioning loads during the summer, etc. The section will also identify greenhouse gas emissions from electrical generation.

VII. Status of Existing Public Purpose Programs

A. Status Report on Renewables Program

B. Energy Efficiency

C. Public Interest Energy Research (PIER)

VIII. Conclusions and Recommendations

This chapter will highlight the findings of each section, identify significant policy issues and any recommendations for consideration.

SUPPORTING TECHNICAL STAFF REPORTS: ENERGY FORECASTS AND OUTLOOKS

A. Natural Gas Supply and Price Outlook

1. Forecast of natural gas used for electricity generation
2. Baseline Gas Demand and Price Forecast
3. Sensitivity Analysis
 - Temperature variations (“cold storm”)
 - Electric generation scenarios (electricity demand scenarios, nuclear shutdown, new CA and regional gas-fired generation, coal replacement)
 - Gas pipeline scenarios
4. Natural gas forecast

B. Electricity Demand Forecast

1. Baseline electricity consumption forecast
2. Peak Demand Forecast
3. Sensitivity Analysis
 - Temperature variations
 - Change in Public Purpose Program funding
4. Western region forecast – tabulation of FERC Form 714

C. Electricity Market Clearing Price Forecast

1. Final price forecast
2. Resource development and retirement scenarios
3. Market uncertainty and attracting new entry

D. Retail Price Outlook, Post-Transition

1. Post-Transition CTC, Trust Transfer Amount, and Nuclear Decommissioning obligations
2. Transmission and Ancillary Service Cost
3. Distribution Upgrades and Outlook
 - a. Review utilities applications and CPUC decisions
 - b. Estimate distribution charges
4. Rate Design Methodologies

5. Retail Price Projections for each Investor-Owned Utility and Public Utilities, by Customer Class

E. Staff White Paper on Demand Responsiveness in Electricity Markets:

The Commission staff is addressing demand responsiveness in this paper because of the substantial concerns about the performance of electricity markets in this initial period of electric market restructuring. Staff believes these markets are inefficient because demand is too inelastic. A consensus is emerging among legislators, policy makers and market participants that greater demand responsiveness is needed. This paper will provide an overview of a wide range of topics that collectively describe both efforts to understand existing demand responsiveness and efforts to improve it through time. An important group of topics describe various programmatic development efforts focusing on UDC rate design, UDC load curtailment programs, and ISO efforts to achieve greater load participation in their markets. Another group of topics addresses the fundamentals of interval metering, predictions of the response of end-users to these new opportunities, and incorporation of these projected impacts in demand forecasts used for planning purposes. Finally, this paper concludes with a set of recommendations for action by the Commission and other agencies.